JC05 Rec'd PCT/PTO 0 5 SEP 2001

FORM PTO-1390 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: G 98-1913 VB/LC

U.S. APPLN. NO. (If known, see 37 CFR 1.5) 09/914776

INTERNATIONAL APPLICATION NO.:	INTERNATIONAL FILING DATE:	PRIORITY DATE CLAIMED:
PCT/FR00/00488	28 FEBRUARY 2000	5 MARCH 1999

TITLE OF INVENTION: COMPOSITIONS FOR PROTECTING CABLE STRANDS FOR HIGHWAY STRUCTURES

APPLICANT(S) FOR DO/EO/US: Cyrille FARGIER, Andre MAYER, Patrick SOUSBIE

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [X] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [X] has been transmitted by the International Bureau. (see attached copy of PCT/IB/308)
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [ ] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Item 11. to 16. below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [ ] A **FIRST** preliminary amendment.
    [ ] A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information:

International Search Report
PCT/IB/308
PCT/IPEA/409

U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 09/914776	INTERNATIONAL APPLICATION NO. PCT/FR00/00488	ATTORNEY'S DOCKET NO. G 98-1913 VB/LC

	CALCULATIONS PTO USE ONLY
17. [X] The following fees are submitted:	
BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):	
Neither international preliminary examination fee (37 CFR1.482) nor international search fee (37 CFR1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO . . . . . $ 1,000.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO . . . . . $ 860.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO . . . . . $ 710.00	
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) . . . . . $ 690.00	
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) . . . . . $ 100.00	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860.00
Surcharge of $130.00 for furnishing the oath or declaration later than 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	15 - 20 =	0	X $18.00	$
Independent claims	- 3 =		X $80.00	$
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			+ $270.00	$

TOTAL OF ABOVE CALCULATIONS =	$ 990.00
Reduction of ½ for filing by small entity, if applicable. Applicant claims Small Entity Status under 37 CFR 1.27. +	$
SUBTOTAL =	$ 990.00
Processing fee of $130 for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR1.49(f)).	$ 130.00
TOTAL NATIONAL FEE =	$ 1,120.00
Fee for recording the enclosed assignment (37 CFR1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +	$
TOTAL FEES ENCLOSED =	$ 1,120.00
Amount to be refunded:	
charged:	

a. [X] A check in the amount of $ **1,120.00** to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. **25-0120** in the amount of $ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required by 37 CFR 1.16 and 1.17, or credit any overpayment to Deposit Account No. **25-0120**. A duplicate copy of this sheet is enclosed.

SEND ALL CORRESPONDENCE TO:

Customer No. 000466
YOUNG & THOMPSON
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September 5, 2001

By Benoît Castel
Benoît Castel
Attorney for Applicants
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PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Cyrille FARGIER et al. Box Non-fee Amendment

Serial No. 09/914,776
(PCT/FR00/00488) GROUP Unassigned

Filed September 5, 2001 Examiner Unassigned

COMPOSITIONS FOR PROTECTING
CABLE STRANDS FOR HIGHWAY STRUCTURES

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to the first Official Action and calculation of the filing fee, please amend the above-identified application as follows:

IN THE ABSTRACT:

Please add the attached Abstract.

IN THE CLAIMS:

Please cancel claims 1-15.

Please add the following new claims:

--16. Protective composition for the strands of sheathed cables for permanent structures, characterized in that it is constituted by a viscoelastic gel obtained by slow in situ polymerization, after injection at ambient temperature into the sheath surrounding the strands and in the presence of a swelling solvent, of monomeric or pre-polymeric reagents which are:

a) identical or different vinyl monomers, polymerizable by free radical technique, or

b) bifunctional or trifunctional compounds of two different types reacting with each other to give bidimensional or tridimensional polymers, or

c) mixtures of a) and b).--

--17. Composition according to claim 16, characterized in that the bi- or tri-functional compounds are polyols and polyisocyanates giving polyurethanes.--

--18. Composition according to claim 16, characterized in that the bi- or tri-functional compounds are bi- or tri-functional epoxy compounds and diamines or triamines giving cross-linked epoxy resins.--

--19. Composition according to claim 16, characterized in that it moreover contains an anti-corrosion agent.--

--20. Composition according to claim 19, characterized in that the anti-corrosion agent is an inorganic compound of the phosphate type or an organic compound of the polyaniline type.--

--21. Composition according to claim 19, characterized in that in the case of epoxy resins, the anti-corrosion agent is constituted by an excess of diamine or triamine such that the final composition has a pH $\geq$ 12.--

--22. Composition according to claim 16, characterized in that the solvent is selected from benzoic acid esters, phtalic acid esters or saturated or unsaturated aliphatic acid esters having in the aliphatic chain at least 10 carbon atoms, aromatic or polycyclic hydrocarbons, terpenes and phenlic ethers if desired lightly polymerized.--

--23. Composition according to claim 16, characterized in that it contains 10 to 90% by weight of polymer and 90 to 10% by weight of swelling solvent, and preferably 15 to 55% by weight of polymer.--

--24. Composition according to claim 16, characterized in that it contains:

. Bisphenol A:	30% by weight
. Cresylglycidyl ether:	2% by weight
. Blocked isocyanate prepolymer	20% by weight
. Aliphatic amines + aliphatic amine prepolymer:	11% by weight
. Neutral and non-reactive aromatic petroleum resins and/or modified hydroxylated petroleum resins (swelling solvent):	37% by weight--

--25. Composition according to claim 16, characterized in that it contains:

. Bisphenol A:	17% by weight
. (2-ethylhexyl) glycidylether:	3% by weight
. Blocked isocyanate prepolymer	5% by weight
. Polyaminoimidazoline:	11% by weight
. Neutral and non-reactive aromatic petroleum resins and/or modified hydroxylated petroleum resins (swelling solvent):	64% by weight--

--26. Composition according to claim 16, characterized in that it contains:

. Bisphenol A:	9% by weight
. Glycidylether:	2% by weight
. Blocked isocyanate prepolymer	2% by weight
. Polyaminoimidazoline:	5% by weight
. Neutral and non-reactive aromatic petroleum resins and/or modified hydroxylated petroleum resins (swelling solvent):	82% by weight--

--27. Composition according to claim 16, characterized in that it contains:

. Butanediol + polyoxymethyleneglycol	58.1% by weight
. Prepolymer of MDI (diphenylmethane-4,4'-diisocyanate):	11.9% by weight
. Diisobutyl phtalate (swelling solvent):	30% by weight--

--28. Composition according to claim 16, characterized in that it contains:

. Urethane/acrylate polymer	35% by weight
. MMA (methyl methacrylate)	60% by weight
. Diisobutyl phtalate (swelling solvent):	10% by weight--

--29. The use of a composition according to claim 16, to increase the shock absorbing coefficient of cables for permanent structures.--

Respectfully submitted,

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November 28, 2001

PROTECTIVE COMPOSITION FOR THE STRANDS OF CABLES FOR PERMANENT STRUCTURES

The present invention relates to a viscoelastlic composition for the production of the strands or filaments of steel cables for permanent structures.

A field of application of the present invention is the construction of cable-stayed bridges, suspension bridges or other suspended structures and, more generally, the construction of any permanent structure in which stays, suspensions or other cables are provided to hold, suspend or consolidate a portion of the construction.

Cables used in these permanent structures are often constituted of strands (stranded assemblies of seven wires) or wires disposed in a bundle and disposed in an external tubular sleeve or envelope which is common to all the strands or to all the wires of the cable. The long lifetime required for these constructions, under conditions of complete safety, require particular care in the protection of the cables against corrosion.

On the other hand, in service, the cables are subjected to substantial vibrations, particularly under the force of wind, rain and loads applied to the structure, for example truck and/or train loads. These vibrations result in rotations or flexture of the cables near their anchors on the construction and, hence, in variations of repeated stress

(fatigue) to which the cables are sensitive. It is thus important to dampen these vibrations so as to reduce the fatigue on the cables.

Various solutions have already been used until now to protect cables against corrosion. A first known solution consists in using galvanized, waxed or greased strands and individually sheathed in a sheath with a thin wall, of polyethylene, having a thickness of about 1.5 mm. The sheathed strands are assembled in a bundle which is streamlined by an external shell or sheath common to all the strands. No filling material is injected in the sheath. This first solution is relatively costly to the extent to which the individually sheathed strands have a cost per unit weight about five times higher than of exposed strands and about twice as high as galvanized strands. Moreover, this first solution does not permit totally eliminating the risk of corrosion. Thus, because of its small thickness, the individual polyethylene sheath of each strand is relatively fragile and as a result can deteriorate in the course of transport of the strands or in the course of their handling in the factory or at the work site. If such deterioration is not corrected, the strands whose individual sheath is thus damaged can corrode more rapidly than intended.

A second solution consists in using strands or wires, if desired galvanized, which are emplaced in a common sheath whose residual internal empty space is filled by injection of a filling material serving as an anti-corrosion product. This injection has the object of ensuring long-term anti-corrosion protection for the strands. The principal injection products already known and used for this purpose, are cement slurry, petroleum wax, epoxy pitch and grease. These various known injection products have the following advantages and disadvantages:

a). Cement slurry

It has the advantage of being economical, but it has the risk of cracking, each crack thus creating a path for infiltration of moisture which can thus reach the strands and as a result give rise to their corrosion. Moreover, once set, the cement slurry is rigid, such that it fixes together all the strands. This gives rise to an increase of inertia of the cable, hence an increase of the flexural stresses. The cement slurry, once set, moreover has the drawback of not permitting individual replacement of one or several strands as needed. Finally, the cement slurry has a relatively great weight, thereby giving an increase to the dip of the cable, hence the length of the cable necessary to join two anchor points.

b). Petroleum wax

It has the advantages of being economical, flexible and permitting individual replacement of the strands of the cable. On the other hand, it has numerous drawbacks:

1) It is difficult to inject. Thus, the injection must be carried out at at least 80°C; the injection must be rapid, and hence carried out at a relatively high pressure when the cables have a great length; and the injection cannot be interrupted, otherwise the wax will solidify. The quality of the injection is hence subordinated to meticulous technique.

2) The external tubular envelope common to all the strands must have a greater thickness so as to be able to resist the temperature and pressure of injection.

3) The wax can harden in contact with the strands and prevent complete filling of the interstices between the wires of a same strand.

4) The wax does not have good mechanical characteristics. Thus, vibrating in their sheath, the strands of the cable make the wax shift and create empty spaces which thus constitute further paths for infiltration by moisture.

5) The sealing of the sheath must be guaranteed during all the life of the cable.

c). Epoxy pitch

It has the advantage of being easily injectable, provided its temperature is greater than 20°C. On the other hand, it

is toxic and not very fluid, and hence penetrates with difficulty small interstices. Moreover, after having been emplaced, it does not permit individual replacement of the strands in case of need.

d). Grease

It is easy to inject. On the other hand, it has a risk of separation of its components with time, and it does not have good mechanical characteristics, unlike petroleum wax.

On the other hand, as to damping vibrations of the cables, solutions have already been proposed and are used individually or in combination. The vibratory phenomena are generally reduced by judicious design of the surface of the sheath, which decreases the coefficient of stress and/or breaking, in case of rain, the rivulet of water oscillating along the sheath, and which is of a nature to reduce the excitative phenomena. Moreover, shock absorbers, for example of the viscoelastic type, can be placed near the anchors of the cables (lower and/or upper anchors), at a distance resulting from a compromise between effectiveness of the shock absorbers and their ease of connection to the permanent structure.

Starting from this state of the art, the present invention has for its object to provide a composition for the protection against corrosion of the strands of sheathed cables

for permanent structures, which will be easily injectable into the cable sheath, with high fluidity, even at low temperature, to be able to penetrate the smallest interstice or empty space in the sheath, whilst permitting individual replacement of one or several strands or wires of the cable whilst conferring to this latter shock absorbing properties for the vibrations to which the cable may be subjected in service.

The problem is solved by using a protective composition obtained by slow in situ polymerization, after injection at ambient temperature into a sheath surrounding the strands, of monomeric or polymeric reagents in the presence of a swelling solvent.

The starting reagents are selected such that the polymerization takes place slowly, allowing time after the preparation of the liquid, to penetrate completely the interstices between wires even in the center of the bundle of strands or wires. This slow reaction is accompanied by a slow increase in viscosity with time, due to the slow formation of a two or three-dimensional polymer which forms a viscoelastic gel under the influence of the swelling solvent.

Various types of monomers or pre-polymers can be used provided the formation of the polymer will be slow and adapted to swell in a solvent forming a gel having viscoelastic properties.

By way of example can be cited the following:

- vinyl homopolymers or copolymers, for example acrylic, obtained by thermal free radical or UV polymerization, or in the presence of a starter, of vinyl monomers or co-monomers,

- by or tri-functional compounds of two different types reacting together to give bi or tri-functional polymers, for example:

. polyurethanes obtained by reaction of polyols and polyisocyanates,

. epoxy resins obtained by crosslinking of a pre-polymeric resin, for example based on Bisphenol A or F, by a bi-functional or tri-functional amine.

Mixtures of these polymers can also be envisaged, for example epoxy/polyurethane resins.

To improve the anti-corrosion effect that the composition inherently has because of the simple fact that its presence, about the strands, in intimate contact with them and with their individual wires, it opposes the entry of water or moisture into the sheath, there can be added an anti-corrosion agent.

This agent could be selected from conventional anti-corrosion inorganic pigments, for example phosphates and particularly zinc phosphate.

There can also be used organic anti-corrosion agents such as the product sold under the name polyanilin by the company ORMECON GmbH.

When epoxy resins are used, the anti-corrosion agent is preferably constituted by an excess of amine used for cross-linking. This excess is computed such that the final pH of the composition will be $\pm$ 12.

The swelling solvent is selected from more or less volatile solvents in the form of a monomer or oligomer. There can be cited aromatic or polycyclic hydrocarbons such as diisopropylnaphthalene and the terpenes, the esters of benzoic acid, of phtalic acid or saturated or unsaturated aliphatic acids having in the aliphatic chain at least 10 carbon atoms, phenolic ethers and particularly oligomeric phenolic resins with a M_n up to 500 and preferably 350.

An example of such a solvent is the oligomeric resin NORSOLENE D 3005.

The viscoelastic and shock absorbing properties of the gel are a function of the proportion of polymer in the gel, which contains from 10 to 90% of polymer and 90 to 10% of swelling solvent, and preferably 15 to 55% of polymer.

By suitable choice of the compounds entering into the protective composition of the invention, it is also possible to provide that at the moment of injection in the cable

sheath, the injected protective composition has a density just above 1. Under these circumstances, the injected composition ejects water of condensation which may be present in the sheath.

There will now be given several examples of protective compositions suitable for the practice of the invention.

- Example 1

. Bisphenol A:	30% by weight
. Cresylglycidyl ether:	2% by weight
. Blocked isocyanate prepolymer	20% by weight
. Aliphatic amines + aliphatic amine prepolymer:	11% by weight
. Neutral and non-reactive aromatic petroleum resins and/or modified hydroxylated petroleum resins (swelling solvent):	37% by weight

- Example 2

. Bisphenol A:	17% by weight
. (2-ethylhexyl) glycidylether:	3% by weight
. Blocked isocyanate prepolymer	5% by weight
. Polyaminoimidazoline:	11% by weight
. Neutral and non-reactive aromatic petroleum resins and/or modified hydroxylated petroleum resins (swelling solvent):	64% by weight

. Example 3

. Bisphenol A:	9% by weight
. Glycidylether:	2% by weight

- Blocked isocyanate prepolymer 2% by weight

- Polyaminoimidazoline: 5% by weight

- Neutral and non-reactive aromatic petroleum resins and/or modified hydroxylated petroleum resins (swelling solvent): 82% by weight

- Example 4

- Butanediol + polyoxymethyleneglycol 58.1% by weight

- Prepolymer of MDI (diphenylmethane-4,4'-diisocyanate): 11.9% by weight

- Diisobutyl phtalate (swelling solvent): 30% by weight

- Example 5

- Urethane/acrylate polymer 35% by weight

- MMA (methyl methacrylate) 60% by weight

- Diisobutyl phtalate (swelling solvent): 10% by weight

The properties of the protective compositions indicated in the examples given above are assembled in the following table:

PROPERTIES	EXAMPLE				
	1	2	3	4	5
Viscosity of the Resin (poise)	90	26	4	4	40
Viscosity of the Hardener (poise)	50	28	20	0.5	-
Viscosity of R + D (poise)	80	28	12	1.5	40
Mode of polymerization	PA	PA	PA	PA	PA
Setting time (DPU)	40 mm	5 h	24 h	20 mn	10 mn
Elongation at rupture	35%	60%	50%	150%	250%
Rupture force (MPa)	3.0	0.3	0.05	0.5	9.8
Density	1.12	1.12	1.05	1.04	0.98
Temperature range (°C) in which tg δ>0.3 at 1 Hz	+30° to +80°	-25° to +80°	-20° to +70°	> -60°	+8° to +70°
tg δ max at 1 Hz in the temperature range	0.58	0.56	0.66	1.4	0.95

In the table, PA means "polyaddition" and PR means "radical layer polymerization". Moreover, tg δ is the ratio of the viscosity module E" to the elastic module E'. To evaluate the viscoelastic properties of the protective compositions according to the invention, E' and E" are measured with the help of a rheometer with imposed deformation of the RSA II type, at different temperatures and different frequencies, and tg δ has been computed from the measured

values of E′ and E″. The above table gives the results obtained for a frequency of 1Hz.

As is well known, the shock absorbing properties of a material are greater the higher is tg δ. Tests carried out by the applicants by subjecting a sheathed multi-strand cable of 40 m to vibrations before and after injection of the protective composition of Example 3 in the sheath of the cable, have shown that this composition permits doubling the shock absorbing coefficient assignable to the cable. A similar result can be expected with protective compositions indicated in the other examples.

Thanks to its viscoelastic properties, the protective composition according to the invention gives rise to an increase of the shock absorbing coefficient of a stay cable, which increase permits:

- either omitting the local shock absorbers generally placed adjacent the anchors of the stay,

- or decreasing the size of said local shock absorbers,

- or decreasing the distance between the local shock absorber and the anchor (which has the effect of decreasing its efficiency, but permits housing it in a structure of the construction), or decreasing the cost of securing the local shock absorber to the structure of the construction.

CLAIMS

1. Protective composition for the strands of cables for permanent structures, characterized in that it is obtained by slow in situ polymerization, after injection at ambient temperature into a sheath surrounding the strands, of monomeric or pre-polymeric reagents in the presence of a swelling solvent.

2. Composition according to claim 1, characterized in that the monomeric reagents are:

a) identical or different vinyl monomers, polymerizable by free radical means, or

b) bi- or tri-functional compounds of two different types reacting together to give bi- or tri-dimensional polymers, or

c) mixtures of a) and b).

3. Composition according to claim 2, characterized in that the bi- or tri-functional compounds are polyols and polyisocyanates giving polyurethanes.

4. Composition according to claim 2, characterized in that the bi- or tri-functional compounds are bi- or tri-

functional epoxy compounds and diamines or triamines giving cross-linked epoxy resins.

5. Composition according to any one of claims 1 to 4, characterized in that it moreover contains an anti-corrosion agent.

6. Composition according to claim 5, characterized in that the anti-corrosion agent is an inorganic compound of the phosphate type or an organic compound of the polyaniline type.

7. Composition according to claim 5, characterized in that in the case of epoxy resins, the anti-corrosion agent is constituted by an excess of diamine or triamine such that the final composition has a pH $\geq$ 12.

8. Composition according to any one of claims 1 to 7, characterized in that the solvent is selected from benzoic acid esters, phtalic acid esters or saturated or unsaturated aliphatic acid esters having in the aliphatic chain at least 10 carbon atoms, aromatic or polycyclic hydrocarbons, terpenes and phenlic ethers if desired lightly polymerized.

9. Composition according to any one of claims 1 to 8, characterized in that it contains 10 to 90% by weight of polymer and 90 to 10% by weight of swelling solvent, and preferably 15 to 55% by weight of polymer.

10. Composition according to claim 2, characterized in that it contains:

. Bisphenol A:	30% by weight
. Cresylglycidyl ether:	2% by weight
. Blocked isocyanate prepolymer	20% by weight
. Aliphatic amines + aliphatic amine prepolymer:	11% by weight
. Neutral and non-reactive aromatic petroleum resins and/or modified hydroxylated petroleum resins (swelling solvent):	37% by weight

11. Composition according to claim 2, characterized in that it contains:

. Bisphenol A:	17% by weight
. (2-ethylhexyl) glycidylether:	3% by weight
. Blocked isocyanate prepolymer	5% by weight
. Polyaminoimidazoline:	11% by weight
. Neutral and non-reactive aromatic petroleum resins and/or modified hydroxylated petroleum resins (swelling solvent):	64% by weight

12. Composition according to claim 2, characterized in that it contains:

. Bisphenol A:	9% by weight
. Glycidylether:	2% by weight
. Blocked isocyanate prepolymer	2% by weight
. Polyaminoimidazoline:	5% by weight
. Neutral and non-reactive aromatic petroleum resins and/or modified hydroxylated petroleum resins (swelling solvent):	82% by weight

13. Composition according to claim 2, characterized in that it contains:

. Butanediol + polyoxymethyleneglycol	58.1% by weight
. Prepolymer of MDI (diphenylmethane-4,4'-diisocyanate):	11.9% by weight
. Diisobutyl phtalate (swelling solvent):	30% by weight

14. Composition according to claim 2, characterized in that it contains:

. Urethane/acrylate polymer	35% by weight
. MMA (methyl methacrylate)	60% by weight
. Diisobutyl phtalate (swelling solvent):	10% by weight

15. The use of a composition according to any one of the preceding claims to increase the shock absorbing coefficient of cables for permanent structures.

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

COMPOSITIONS FOR PROTECTING CABLE STRANDS FOR HIGHWAY STRUCTURES

the specification of which: *(check one)*

REGULAR OR DESIGN APPLICATION

[ ] is attached hereto.

[ ] was filed on as application Serial No. and was amended on (if applicable).

PCT FILED APPLICATION ENTERING NATIONAL STAGE

[X] was described and claimed in International application PCT/FR00/00488 filed on 28 February 2000 and as amended on (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

PRIORITY CLAIM

I hereby claim foreign priority benefits under 35 USC 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)

Country	Application Number	Date of Filing (day, month, year)	Priority Claimed
France	**99/02754**	**5 March 1999**	**yes**

(Complete this part only if this is a continuing application.)

I hereby claim the benefit under 35 USC 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (Filing Date) (Status--patented, pending, abandoned)

POWER OF ATTORNEY

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from **Cabinet Loyer** as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

As a named inventor, I hereby appoint the registered patent attorneys represented by Customer No. **000466** to prosecute this application and transact all business in the Patent and Trademark Office connected therewith, including: **Robert J. PATCH, Reg. No. 17,355, Andrew J. PATCH, Reg. No. 32,925, Robert F. HARGEST, Reg. No. 25,590, Benoît CASTEL, Reg. No. 35,041, Eric JENSEN, Reg. No. 37,855, Thomas W. PERKINS, Reg. No. 33,027, and Roland E. LONG, Jr., Reg. No. 41,949,**

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PATENT TRADEMARK OFFICE

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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